

- 22 **Lucia A**, Hoyos J, Santalla A, et al. Tour de France versus Vuelta a España: which is harder? *Med Sci Sports Exerc* 2003;**35**:872–8.
- 23 **Padilla S**, Mujika I, Orbañanos J, et al. Exercise intensity and load during mass-start stage races in professional road cycling. *Med Sci Sports Exerc* 2001;**33**:796–802.
- 24 **Impellizzeri F**, Sassi A, Rodriguez-Alonso M, et al. Exercise intensity during off-road cycling competitions. *Med Sci Sports Exerc* 2002;**34**:1808–13.
- 25 **Gonzalez-Haro C**, Gonzalez-de-Suso JM, Padullles JM, et al. Physiological adaptation during short distance triathlon swimming and cycling sectors simulation. *Physiol Behav* 2005;**86**:467–74.
- 26 **Tomlin DL**, Wenger HA. The relationship between aerobic fitness and recovery from high intensity intermittent exercise. *Sports Med* 2001;**31**:1–11.
- 27 **Starritt EC**, Howlett RA, Heigenhauser GJ, et al. Sensitivity of CPT I to malonyl-CoA in trained and untrained human skeletal muscle. *Am J Physiol* 2000;**278**:462–8.
- 28 **Coyle EF**, Coggan AR, Hopper MK, et al. Determinants of endurance in well-trained cyclists. *J Appl Physiol* 1988;**64**:2622–30.
- 29 **Laursen PB**, Jenkins DG. The scientific basis for high-intensity interval training: optimising training and maximising performance in highly trained endurance athletes. *Sports Med* 2002;**32**:53–73.

COMMENTARY

Evidence indicates that the training-induced increase in fat oxidation is primarily due to increased oxidation of non-plasma-derived fatty acids. Fat oxidation in high-intensity

exercise is lower than in moderate-intensity exercise because of decreased fatty acid delivery to exercising muscles. High carbohydrate diet during high-intensity exercise increases fat oxidation. This is a good-quality, newly approached and original study conducted on triathlon athletes and cyclists of high competitive level. The authors have meticulously designed a cross-sectional study to measure the rate of fat oxidation of endurance athletes. The claims in the study are technically well supported. A new concept of measuring the rate of fat oxidation at relative work intensities by indirect calorimetry and using stoichiometric equations has been devised, which has been used previously in only a few studies. Significant results have been drawn from the study. This study needs to be designed further as a longitudinal one with a large population, including various other aspects such as longer duration of the study, training schedule, dietary pattern of the athletes and hormonal effects. If the results obtained are significant, it should be a useful tool for researchers world wide in the field of sports medicine.

M Chander

National Institute of Sports, Patiala, India; drmunishvatsh@yahoo.com

EDITORIAL BOARD MEMBER

Francisco Arroyo

Dr Arroyo graduated from the University Autonoma of Guadalajara and completed a fellowship in sports medicine in Columbus, Ohio. He focuses on the pathologies of soccer players, related to physiology and traumatic injuries. He lectures and publishes research on soccer internationally. He has worked in sports medicine since 1989 with professional and amateur athletes from a variety of sports, including five professional soccer teams, American football, professional basketball, Olympic volleyball and tae kwon do teams, and is also medical advisor to the marathon organisation in Guadalajara.



Figure 1 Francisco Arroyo.